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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/862,458	05/23/2001	Masahiko Tanaka	001425-104	7476
21839	7590	04/01/2004	EXAMINER	
BURNS DOANE SWECKER & MATHIS L L P			MOORE, KARLA A	
POST OFFICE BOX 1404			ART UNIT	
ALEXANDRIA, VA 22313-1404			PAPER NUMBER	

1763

DATE MAILED: 04/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/862,458

Applicant(s)

TANAKA ET AL.

Examiner

Karla Moore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,8-11,14-17,20-24,26 and 27 is/are rejected.
- 7) ☒ Claim(s) 2,3,6,7,12,13,18,19 and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4-5, 8-9, 11, 14-15, 17 and 20-24, 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,083,363 to Ashtiani et al. in view of U.S. Patent No. 6,086,677 to Umotoy et al.

3. Ashtiani et al. disclose the invention substantially as claimed in Figure 1 and comprising: a vacuum reaction chamber (column 4, rows 39-43) and a electrically conducting dividing plate (Figure 1, 52; Figure 4A, 54; column 6, rows 51-57 and column 7, rows 8-11), the vacuum reaction chamber is divided into a plasma discharge space (12) and a film deposition process space (14; column 1, 13-25), the dividing plate having a plurality of holes (55) therein, the plurality of holes connect the plasma discharge space with the film deposition process space, and a plasma is used to generate radicals in the plasma discharge space, which radicals are introduced into the said film deposition process space through the plurality of holes in the dividing plate, the radicals are introduced into the film deposition process space to deposit a film on a substrate (18) disposed in the film deposition process space, the dividing plate is made of a plurality of laminated (layered) plates (Figure 5, 80, 82, 84; column 7, rows 35-39).

4. However, Ashtiani et al. fail to teach the dividing plate further comprising internal spaces separated from the plasma discharge space and connected with the film deposition process space, and a precursor gas is introduced is directly introduced into the film deposition process space from the internal spaces, whereby the radicals and precursor gas introduced into the film deposition process space react together to deposit a film on a substrate disposed in the film deposition process space.

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5. Umotoy et al. teach the use of a multiple plate gas introduction apparatus (see Figures 1 and 9) with a plurality of holes (multiple part numbers, 206, 210, 604) and internal spaces (multiple part numbers, 204 and 208) for the purpose of providing at least two gases to a process region without commingling of the gases prior to reaching the process region (column 2, rows 39-43).

6. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a multiple plate gas introduction apparatus with a plurality of holes and internal spaces in Ashtiani et al. in order to provide at least two gases to a process region without commingling of the gases prior to reaching the process region as taught by Umotoy et al.

7. Ashtiani et al. further fail to teach the dividing plate is made of a plurality of plates connected together by securely bonding them over substantially an entire area of their interfacial surfaces.

8. Umotoy et al. teach fusing together a plurality of laminated plates at their contacting surfaces for the purpose of avoiding the use of o-rings while maintaining separation of gases as gases transition from the upper plate to the lower plate (column 3, rows 33-44 and column 5, rows 5-15).

9. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a plurality of laminated plates fused together at their contacting surfaces in order to avoid the use of o-rings while maintaining a separation of gases as the gases transition from an upper plate to a lower plate as taught by Umotoy et al.

10. With respect to claims 5 and 8, both Ashtiani et al. disclose the invention substantially as claimed and as described above.

11. However, the Ashtiani et al. fail to teach the plurality of holes formed to satisfy the condition $uL/D > 1$, where u is the gas flow rate inside the holes, L is the effective length of the holes and D is the diffusion coefficient.

12. Umotoy et al. teach that the choice of hole size for each gas is purely a process condition and as such, hole size will depend on gas flow rate, gas pressure, gas type, chamber pressure and the like (column 5, rows 57-63).

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13. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to find an optimum gas hole configuration in Ashtiani et al. based on conditions of each individual process as taught by Umotoy et al.

14. Further, the courts have ruled where the general conditions of a claim are disclosed by the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 2235 (CCPA 1955).

15. With respect to claims 9, 15, 21, 24, Ashtiani et al. teaches that the dividing plate is made of electrically conductive material (column 6, rows 51-57).

16. Claims 10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ashtiani et al. and Umotoy et al. as applied to claims 1, 4-5, 8-9, 11, 14-15, 17 and 20-24, 26-27 above, and in view of U.S. Patent No. 5,433,786 to Hu et al.

17. Ashtiani et al. and Umotoy et al. disclose the invention substantially as claimed and as described above.

18. However, Ashtiani et al. and Umotoy et al. fail to teach the plurality of plates bonded together by a plurality of rivets.

19. Hu et al. teach the use of rivets and other suitable fastening means for the purpose of assembling an electrode (column 3, rows 53-56).

20. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided rivets or other suitable fastening means in Ashtiani et al. and Umotoy et al. in order to assemble the dividing plate/electrode as taught by Hu et al.

Allowable Subject Matter

21. Claims 2-3, 6-7, 12-13, 18-19 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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22. The prior art presented above fails to teach or fairly suggest a plurality of metal fixings (either rivets or threaded parts) to securely bond the laminated plates over the entire area of their interfacial surfaces, and the plurality of holes provided in the dividing plate are provided through the metal fixings. Additionally, no other prior art reference provides motivation for the feature.

Response to Arguments

23. Applicant's arguments filed 1/12/04 with respect to claims 1-27 have been fully considered but they are not persuasive. Applicant argues that the Ashtiani does not recognize a need or desirability of providing at least two gases to a process region without commingling of the gases prior to reaching the processing region. Examiner does not agree with this statement. In fact, the invention of Ashtiani discloses separate introduction of two gases (through structures 24 and 70) prior to reaching the processing region. Additionally, Examiner points out that motivation for the feature at issue is provided by Umotoy (see column 2, rows 39-43 and column 1, rows 55-63). Further, in response to Applicant's arguments against the references individually, Examiner points out that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant also argues that modification of Ashtiani with the plate of Umotoy would render the Ashtiani device unworkable. Examiner disagrees with this characterization. Using a plate like the one in Umotoy (i.e. one with two sets of non-communicating holes for delivering two different gases without commingling prior to reaching the processing region) one would be able to supply a plasma gas containing ions and a second reactant gas without commingling the two. This would be desirable for the reasons mentioned in the Umotoy citations noted above. Examiner notes that both Umotoy and Ashtiani teach the sizes of the wholes can be modified based on the intended use of and/or the materials used the apparatus.

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Conclusion

24. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571.272.1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

km
24 March 2004

p. Hassanzadeh
Parviz Hassanzadeh
Primary Examiner
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